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## PROBLEMS FOR SOLUTION.

### ALGEBRA.

193. Errata. For  $\sum \frac{a_i^2}{h_i^2}$  read  $\sum \frac{a_i^2}{h_i}$ .

195. Proposed by W. J. GREENSTREET, A. M., Editor of the *Mathematical Gazette*, Stroud, England.

Prove that when  $n$  is a positive integer,

$$\sum_{r=1}^{r=n} (-1)^r {}_nC_r 2^{n-r} r^2 = n^2 - 2n.$$

196. Proposed by L. E. NEWCOMB, Los Gatos, California.

Find the  $r$ th term of  $\left(x - \frac{1}{x}\right)^n \equiv z^n$  in terms of  $z$ .

197. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

$$\text{Solve } (18)^{4(2-x)} = (54\sqrt{2})^{3x-2}.$$

### GEOMETRY.

221. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

Construct a right triangle with given hypotenuse  $h$ , and having an inscribed square of side 12 with a side lying along the hypotenuse. Show further that the minimum value of  $h$  is 36, the triangle being then isosceles.

222. Proposed by G. B. M. ZERR, A. M., Ph. D., Parsons, W. Va.

At the ends of a focal chord  $CC'$  of a parabola are drawn the normal chords  $CD$ ,  $C'D'$ . Prove that  $DD'$  is parallel to  $CC'$  and equal to three times its length.

223. Proposed by W. J. GREENSTREET, A. M., Editor of The *Mathematical Gazette*, Stroud, England.

Find a point  $C$  in a given line  $AB$ , so the lines joining  $C$  to the angular points of a triangle  $PQR$  coplanar with the given line may cut off on any line parallel to the given line and lying in the same plane two equal segments.

### CALCULUS.

176. Proposed by B. F. FINKEL, A. M., M. Sc., 204 St. Marks Square, Philadelphia, Pa.

Show by any method, Riemann's excepted, that

$$\int_0^\infty e^{-x^2} \cos \frac{b^2}{x^2} dx = \frac{1}{2} \sqrt{(\pi)} e^{-b^2/2} \cos b \sqrt{2}.$$

177. Proposed by O. W. ANTHONY, Head of Mathematical Department, DeWitt Clinton High School, New York City.

Find the volume of the minimum cone which can be circumscribed about a hemisphere.